

motor tract of the pons varolii and the corpora quadrigemina; the radiating fibres (*dilator pupillæ*) are supplied by the sympathetic from the cilio-spinal centre situated in the spinal cord between the 6th cervical and 2nd dorsal nerves. By irritation or paralysis of one or other of these musculo-nervous mechanisms, contraction or dilatation of the pupil is accomplished. Now, the cerebro-spinal system responds more rapidly to excitation than the sympathetic, consequently, the trophic stimulation of chloroform reaches the sphincter pupillæ before the counteracting sympathetic impulse arrives in the dilator fibres, and the first phenomenon noticed in the pupils is contraction. The equilibrium is soon established, but is of short duration, and as the pons varolii begins to yield, dilatation increases. The rule then is: the pupil is dilated during surgical anæsthesia. When death occurs before surgical anæsthesia has been reached, and when, in this case, we find a contracted pupil, the surgeon not having commenced to operate, death is usually due to the audacious or ignorant chloroformist. He has crowded the vapor on the patient; the blood has been called to the abdominal organs and, as a consequence, this chloroformed blood has paralyzed the sympathetic system. The pupil contracts, and I need scarcely add that death begins at the heart.

When surgical anæsthesia is reached, touching the corneal conjunctiva fails to excite palpebral reflex. This reflex act is, excepting dilatation of the pupil, the last of those of the "life of relation" to disappear, and the time of its abolition is yet far enough removed from the period of toxic accidents produced by chloroformic drowning. On the other hand, returning consciousness is first indicated by the restoration of palpebral reflex in the form of fibrillary contractions of the inferior eye-lid. That contractions can be first awakened in the lower eye-lid is due to its chief nervous supply being from the portio-dura, while the upper eye-lid is, in the greater part, supplied by the patheticus and motor oculi. If, then, we pay attention to palpebral reflex, we can, after anæsthesia is reached, regulate inhalation by suppressing and recommencing according as we cannot or can excite contractions in the lower eye-lid. A minute observation of this phenomenon must not, however, exclude an attentive surveillance of the rhythm of respiration, and general muscular relax-

ation. The difference noticed in the doses required to produce toxic effects in different individuals is chiefly due to personal idiosyncrasy, the purity of the chloroform and the method of administration.

Vomiting is of more frequent occurrence under ether than chloroform. This is in a large measure due to the more grateful odor of chloroformic vapor, and the comparative shortness of the period of excitement. When vomiting occurs in the primary stage of inhalation, it is produced by pharyngeal reflex and is accompanied by nausea due to cerebral anæmia. The chloroform which produces such vomiting is dangerously impure and should be at once discarded; it will assuredly produce cardiac syncope by trifacial or superior laryngeal reflex. A less impure article will usually produce vomiting during the anæsthetic stage, though here the amount of air which has been swallowed plays a part. This air irritates the terminal fibres of the gastric plexus, and by reflex through the vomiting centre, the phrenic nerves stimulate the diaphragm to fixity, and the vagi produce expulsive efforts of the stomach. Nausea is absent. Pure chloroform seldom produces vomiting, provided the patient's stomach be empty. Let us then order our patients not to eat any solid food for twelve hours, or swallow liquid food for four hours before we commence to operate. Of course, we do not include in this last category the usual glass of brandy which, if given, should be administered immediately before placing the patient on the operating table. Furthermore, we should prescribe gargles of bromide of potash to lessen pharyngeal susceptibility, and use only pure chloroform. With these precautions vomiting is generally avoided, and this alone is a matter of much moment, especially in abdominal surgery.

Chloroform anæsthetizes by producing a temporary sclerosis of the afferent nerve-cells of the cerebro-spinal system, and by inhibiting the molecular interchanges of animal chemistry. It is however an open question as to whether the motor nerves of animal life are affected by chloroform, but from its action on the heart it would appear that the organo-motors are, at least, rendered parietic. Anæsthesia commences at the periphery and proceeds towards the animating and co-ordinating centres of animal and organic life. Owing, however, to a more liberal nerve supply, some portions of the integument are more hyperæsthetic